

Abstract of the Invention

Thermally stable electrolytes for Li-ion batteries obtained with the use of Lewis base additives to the electrolytes are disclosed. The Lewis bases stabilize electrolytes composed of solutions of LiPF_6 in organic carbonates against decomposition at temperatures as high as 85 °C. Additives suitable for stabilizing LiPF_6 -containing electrolytes include amines, for example, triethylenediamine (TEDA) and 2,2'-bipyridine (BIPY), phosphines, for example, triphenylphosphine (TPP) and tributylphosphine (TBP), and nitrogen-phosphorus bonded compounds such as hexamethoxycyclotriphosphazene ($[\text{N}=\text{P}(\text{OCH}_3)_2]_3$) (HMOPA), hexamethyl phosphoramidate (HMPA), and *N*-phenyl-*P,P,P*-trimethylphosphorimidate (PhTMI). These additives are also capable of stabilizing electrolytes in solvents other than carbonates including ethers, esters and sulfones.